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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,730	12/29/2000	Koichi Watanabe	017447/0170	3938
22428 7590 11/15/2007 FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			EXAMINER IP, SIKYIN	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 11/15/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/720,730	<b>Applicant(s)</b> WATANABE ET AL.	
	<b>Examiner</b> Sikyln Ip	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,5,7-10,14-18 and 20-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7-10,14-18 and 20-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating

obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 5, 7-10, 14-18, and 20-23 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5693203 to Ohhashi et al (col. 6, lines 32-63) in view of applicant's admission (Rule 132 declaration filed on April 12, 2004, items 3-4).

Ohhashi discloses the features including the claimed backing plate (col. 4, lines 65-67), Nb sputtering target (col. 4, lines 61-64) and grain size (col. 6, lines 1-20). Ohhashi also discloses a sputtering target structure (Figure 1). The difference between the reference and the claims are as follows: the cited reference does not disclose the % of grain deviation and O and/or Ta content dispersion in the target. However, sputtering target taught by Ohhashi is directed to uniform microstructure which requires uniform grain size and no or little diffusion of their constituent atoms (col. 6, lines 32-62). Thus, uniform grain size meets the claimed grain size range. Ohhashi does not disclose O and Ta contents. But, claimed Ta concentration is merely conventional in crude niobium metal. Moreover, applicant's admission in Rule 132 declaration, items 3-4,

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acknowledges that Ta and O are inevitable impurities that exist even in high purity Nb sputtering target. In view of applicant's admission, ordinary skill artisan would recognize Nb sputtering target of Ohhashi would inherently possess Ta and O as inevitable impurities. Since Ta and O are inevitable impurities, their dispersion would be uniform in Nb sputtering target. Thus, the dispersion % of said O and Ta is zero. Moreover, difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143 and In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966).

With respect to the limitation

~~being respectively defined by the following equation, for respective measured content values~~

“ of 9 specimens sampled at respective predetermined positions in the target:

” in claim 1, for

example, first it is a product-by-processing step which carries insignificant patentable weight if it does not change the structure/property of the final product. Second, said step merely measure the dispersions of Ta and O impurities which are already in the target if they do exist. Third, in said step, the number of samplings at various positions in the target would not affect the dispersion % when the dispersion of Ta and O impurities are uniform in the target.

With respect to the dispersion % expression, that it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Taklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75.

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Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5693203 to Ohhashi et al as applied to claims above, and further in view of acknowledged prior art admission in page 2, lines 1-24.

The claimed subject matter as is disclosed and rejected above by the cited reference(s) except for the use of the Nb sputtering target. However, acknowledged prior art discloses the claimed use of the Nb sputtering target in the same field of endeavor or the analogous metallurgical art. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to use Nb sputtering target as taught by acknowledged prior art admission in order to reduce the interconnection resistance and improve reflow characteristics of Al (See instant specification page 2, lines 20-24). In re Venner, 120 USPQ 193 (CCPA 1958), In re LaVerne, et al., 108 USPQ 335, and In re Aller, et al., 105 USPQ 233.

### **Response to Arguments**

Applicant's argument filed August 20, 2007 have been fully considered but they are not persuasive.

Applicants argue that Ohhashi does not disclose claimed amount and dispersion. First, the claimed Ta and O are inevitable impurities. There is no factual evidence that the claimed ranges of Ta and O impurities are critical and not inherent in commercial Nb. The claimed dispersion % includes zero when dispersion is uniform/constant that maximum value is same as minimum value.

Applicants' argument in page 8, first paragraph is noted. But, uniform microstructure as taught by Ohhashi does not exclude uniform dispersion. Moreover, the dispersion % does not affected by the claimed Ta and/or O concentration.

Applicants argue that Ohhashi does not teach Nb sputtering target contain impurities Ta and O and their dispersion. But, applicants' attention is directed to col. 6, (3) a sputtering target assembly composed of two-layer structure of a sputtering target and a backing plate having an bonded interface therebetween wherein the sputtering target is made of a material selected from the group consisting of a refractory metal of W, Mo, Ti, Ta, Zr and Nb and refractory metal-based alloys and said backing ). Nb is taught lines 32-37 of Ohhashi ( as sputtering target. With respect to the Ta and O impurities contents and their dispersions that first if the Ta and O are inevitable impurities, they are inherently in the Nb sputtering target. Difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143. Changing form, purity, or other characteristic of an old product does not render the novel form patentable where the difference in form, purity or characteristic was inherent in or rendered obvious by the prior art. In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966). Moreover, the claimed Ta concentration is merely conventional concentration in crude niobium metal. Second, if the dispersion is uniform (maximum value equal minimum value), then the dispersion is zero. Ohhashi discloses target having uniform microstructure (col. 6, line 42) and with no or little diffusion of their constituent atoms (col. 6, lines 57-58). That reads dispersion is zero. Furthermore, the instant claimed dispersion (%) of oxygen is up to 80% (claim 18) which hardly excludes any dispersion. Assuming arguendo that the Ta dispersion is non-uniform as targets 3 and 4 in instant Table A. The difference of resistivity of interconnection film is less than 3%. In view of data in instant specification that the claimed dispersions do not have significant affect

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on sputtering target properties. Thus, the claimed dispersion (%) has no criticality or unexpected result.

~~As discussed above, however, Ohhashi does not recognize the specific problems with~~

Applicants argue that “ inevitable Ta or oxygen impurities in a Nb target. ~~Ohhashi's disclosure of a uniform~~ ”. But, in

132 declaration, section 4, filed on April 12, 2004, applicants argue that

(4) JP 62-103335 provides further evidence that one skilled in the art would not reasonably interpret claims 1 and 18 to contain a zero amount of Ta and oxygen, respectively. I understand that JP 62-103335 was submitted in the Information Disclosure Statement filed on December 29, 2000 in the above identified application. JP 62-103335 discloses super high purity Nb having an excellent workability for a superconductive material and discloses the Nb as containing 30 ppm or less of Ta and 10 ppm or less of each of oxygen, carbon, nitrogen and hydrogen, which is produced by a high quality manufacturing method. As demonstrated by JP 62-103335, Ta and oxygen exist as impurities in Nb even for super high purity Nb produced by high quality manufacturing methods. One skilled in the art would reasonably interpret claims 1 and 18 as requiring some amount of Ta and oxygen impurity as evidenced by JP 62-103335, because these “ Impurities exist even in super high purity Nb.

” So, Ta and O impurities in

ultra high purity Nb is well known and are controlled less than 30 ppm and 10 ppm respectively. Since the Ta and O impurities are well known in the art of Ohhashi, Ohhashi needs not to disclose the well known impurities. Moreover, as is shown by JP 62-103335 that Ta and O are controlled to be less than 30 ppm and 10 ppm respectively in ultra high purity Nb which are much lower than the instant claimed Ta less than 3000 ppm and O less than 200 ppm (claims 1 and 18). In view of JP 62-103335, Ta and O are known to be much higher in crude niobium metal.

Applicants argue that prior arts do not recognize the effect of Ta and O impurities. But, the fact that applicants have recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*,

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227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Because applicants have different reason to reduce the Ta and O impurities that does not change the teaching of prior art to eliminate the Ta and O impurities.

~~dispersion % of these impurities are zero. To the contrary, the many examples of non-zero dispersion % in the present specification clearly suggests that a zero dispersion % of oxygen~~

Applicants argue that “~~and Ta in Nb sputtering targets is not inherent. Merely because an element is an impurity—~~” But, they are

~~are EB melted appropriately between one to multiple times to prepare 6 kinds of Nb ingots (diameter of 230mm) different in the Ta content.~~

done by different process steps ( ~~the Ta content.~~ ).

~~Merely because an element is an impurity does not suggest that it has a uniform distribution. If the Examiner maintains this contention, applicants respectfully request the Examiner to provide evidence supporting his contention.~~

Applicants argue that “~~applicants respectfully request the Examiner to provide evidence supporting his contention.~~” Ohhashi

in col. 6, lines 42, discloses uniform microstructure (see below)

40 bonded interface being solid-phase bonded interface accompanied with no appreciable thermal diffusion layer and by said target having uniform microstructure having crystal grain sizes of no more than 350  $\mu\text{m}$ , said target

. Moreover, applicants have no shown the Nb alloys Ohhashi and JP 62-10335 do not have the claimed dispersions %.

Applicants' argument in page 15 of instant remarks is noted. But, the claimed Nb sputtering target and composition are taught by cited reference; consequently, the properties as recited in the instant claims would have inherently possessed by the teachings of the cited references. Therefore, the burden is on the applicant to prove that the product of the prior art does not necessarily or inherently possess characteristics attributed to the claimed product.

In re Best, 195 USPQ, 430 and MPEP § 2112.01.

“Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, In re Best, 195 USPQ 430, 433 (CCPA 1977). ‘When the PTO shows a sound basis for believing that the products of the applicant and the prior art



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are the same, the applicant has the burden of showing that they are not.' In re Spada, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. In re Best, 195 USPQ 430, 433 (CCPA 1977)."

Applicants' argument in page 10, second full paragraph of instant remarks is noted. But, Ohhashi discloses grain size overlapped the claimed grain size. Thus, the grain size ratio and dispersion of grain size ratio of adjacent grains would have been overlapped in the absence of contrarily.

#### Conclusion

The above rejection relies on the reference(s) for all the teachings expressed in the text(s) of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the text(s) of the reference(s). To emphasize certain aspect(s) of the prior art, only specific portion(s) of the text(s) have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combination of the cited references may be relied on in future rejection(s) in view of amendment(s).

All recited limitations in the instant claims have been meet by the rejections as set forth above.

Applicant is reminded that when amendment and/or revision is required, applicant should therefore provide a concise explanation and support with page and line number in the specification for any amendments made to the disclosure. See 37 C.F.R. Part §41.37 (c)(1)(v).

#### Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Friday from 5:30 A.M. to 2:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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S. Ip  
October 29, 2007